VIRGINIA STANDARDS OF LEARNING

Spring 2004 Released Test

END OF COURSE
Earth Science

Large Print Form

Property of the Virginia Department of Education

DIRECTIONS

Read each question carefully and choose the best answer.

SAMPLE

Which of these can be used to measure atmospheric pressure?

A An anemometer
B A barometer
C A thermometer
D A seismometer

GO ON

1 A student found a rock and weighed it to determine its mass. What steps should the student take to find its density?

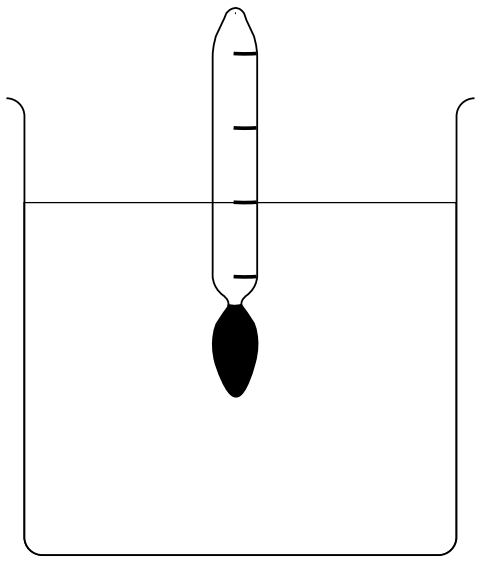
A Determine its volume by how much water it displaces, then divide mass by volume

B Determine its volume by multiplying length × width × height, then divide mass by volume

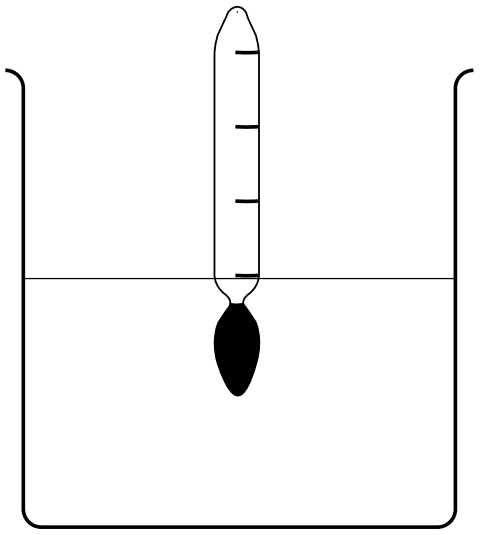
C Crush the rock to a powder and measure its volume in a graduated cylinder, then divide mass by volume

D Determine its volume using the formula for the volume of a sphere ($V = \frac{4}{3}\pi r^3$), then divide mass by volume

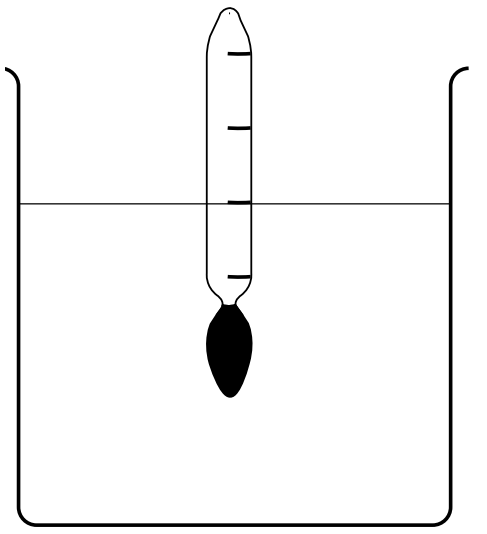
2



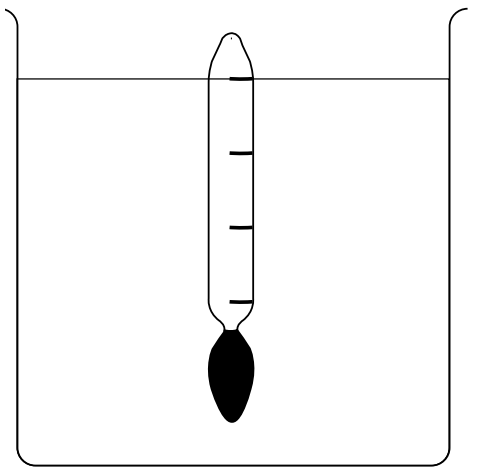
The picture above shows a hydrometer in water. The same hydrometer was placed in the liquids below. Which liquid is denser than water?



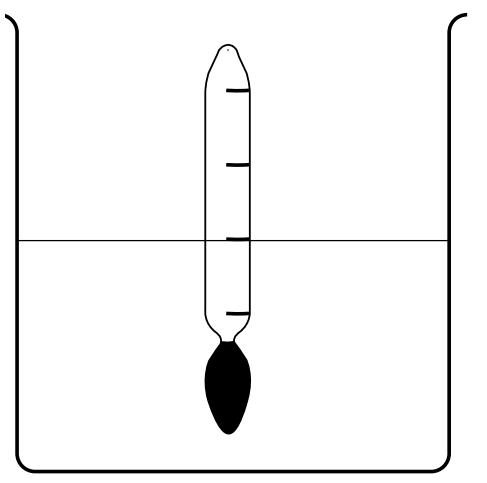
F



H



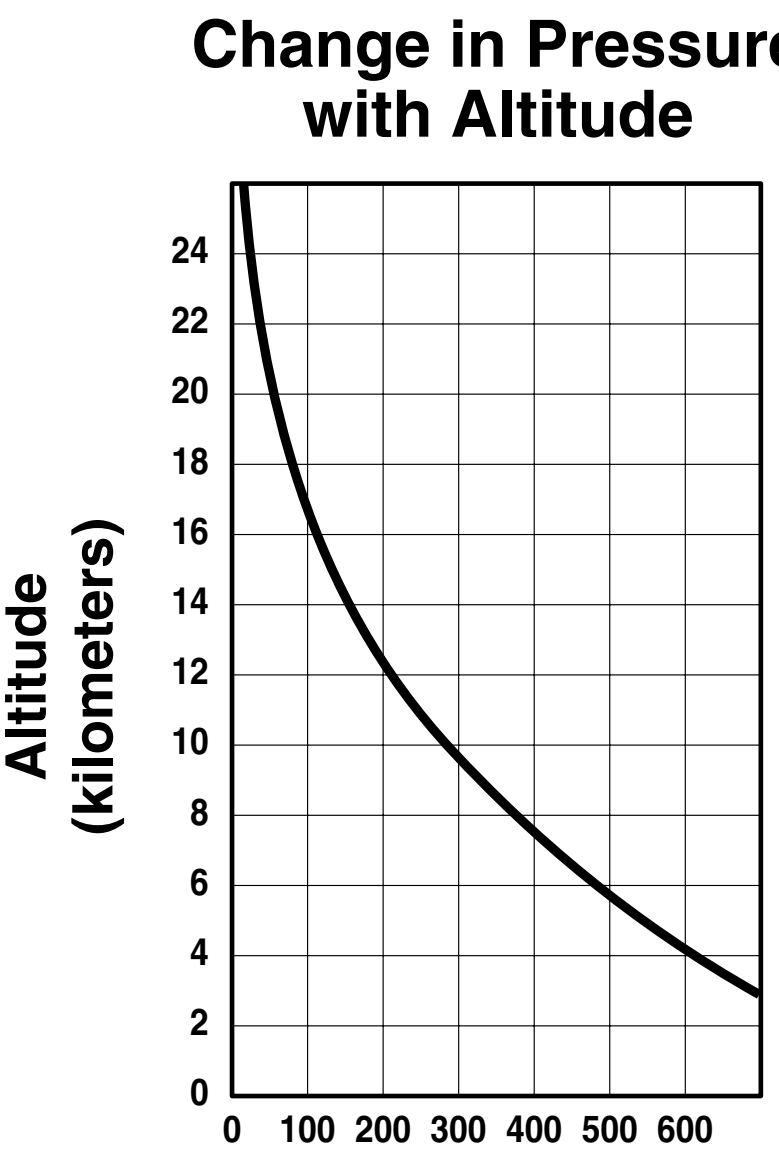
G



J

GO ON

3



The chart shows the relationship between altitude and air pressure. What is the approximate air pressure at an altitude of 22 kilometers?

A 40 millibars

B 120 millibars

C 200 millibars

D 400 millibars

GO ON

4 A student set up an experiment to test the effects of soil compaction on plant growth. The student put equal weights of moist soil into 10 containers, planted a bean seed one inch deep in each container, and then firmly compacted the soil in 5 of the containers. After the seeds sprouted, the student measured the height of each plant every day and kept a record of the results. What else must the student do over time to ensure a valid experiment?

F Water any container in which the soil feels dry

G Water all of the containers the same amount and at the same time

H Water any of the plants that seem to be growing more slowly than the others

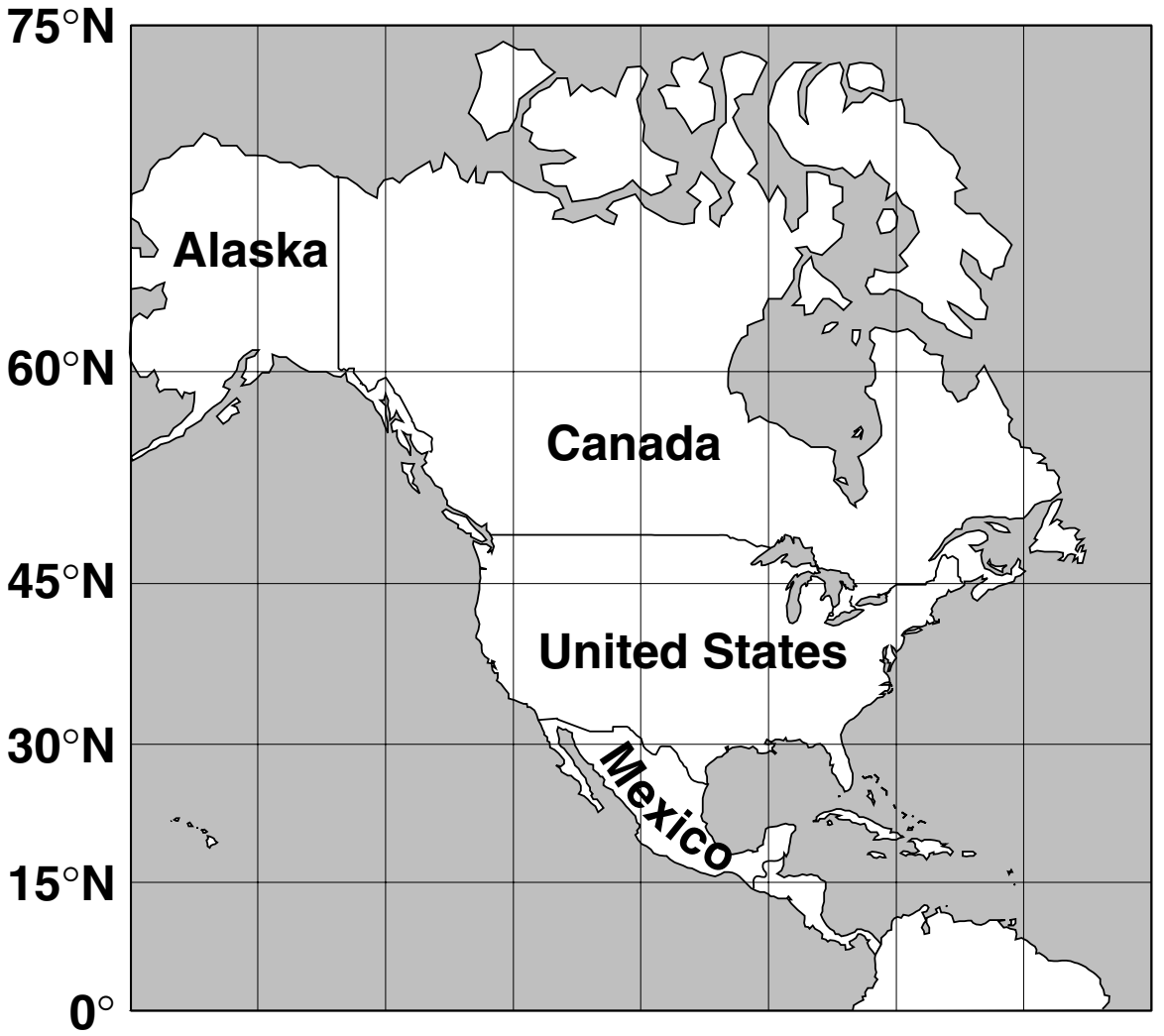
J Water the plants in compacted soil more than those in uncompacted soil

GO ON

Turn the page and continue working.

5

Mercator Projection of North America



GO ON

In this Mercator map of North America, Canada and Alaska together appear larger than the United States and Mexico together when in fact they are smaller. What causes this distortion?

A Mountains get flattened on a map so that mountainous areas look larger than they really are.

B The northern regions are enlarged because the shallower parts of the oceans are frozen.

C The latitude and longitude lines create an optical illusion.

D The map is a projection of a round world onto a flat surface.

6 Which of these is the best evidence that the Earth's crust has undergone some major changes?

F The location of major rivers

G The amount of available water on Earth

H The presence of marine fossils in mountain rock

J The arrival of the vernal equinox

7 The Southern Hemisphere is warmer in January than in July because

A it is experiencing summer

B the cold winds are concentrated in the Northern hemisphere

C the sun puts out more energy

D the hole in the ozone layer allows more heat into the atmosphere

8

MOHS' SCALE OF HARDNESS

Mineral	Hardness	Common Tests
Talc	1	Scratched by a fingernail
Gypsum	2	
Calcite	3	Scratched by a copper coin
Fluorite	4	Scratched by a knife blade
Apatite	5	
Feldspar	6	Scratches a knife blade
Quartz	7	
Topaz	8	
Corundum	9	
Diamond	10	Scratches all common materials

Which conclusion can be made based on the information in the chart?

F Quartz is harder than topaz.

G Calcite is harder than apatite.

H Fluorite is harder than feldspar.

J Gypsum is harder than talc.

9 Which of the following minerals, when in the form of sand, can be used to manufacture glass?

A Gypsum
B Diamond
C Calcite
D Quartz

10 More often than metamorphic or igneous rocks, sedimentary rocks have

F many holes from trapped gases
G large quartz crystals
H numerous fossils
J a glassy appearance

GO ON

11 Heat and pressure can transform igneous rock into metamorphic rock. What processes can transform igneous rock into sedimentary rock?

A Heat and pressure

B Rifting and subduction

C Erosion and sedimentation

D Evaporation and condensation

12 The mineral resources of Virginia can be conserved by doing all of the following EXCEPT

F recycling

G reducing

H regenerating

J reusing

13 Which of these energy sources originates from a nonrenewable resource?

A Solar

B Geothermal

C Fossil fuel

D Hydroelectric

14 Which of the following are some of the major mineral resources of Virginia?

F Diamonds, sapphires, and rubies

G Coal, granite, and limestone

H Sulfur, fluorite, and cobalt

J Gold, silver, and copper

15 Lightweight and strong, the metal that has been recycled with the GREATEST success is

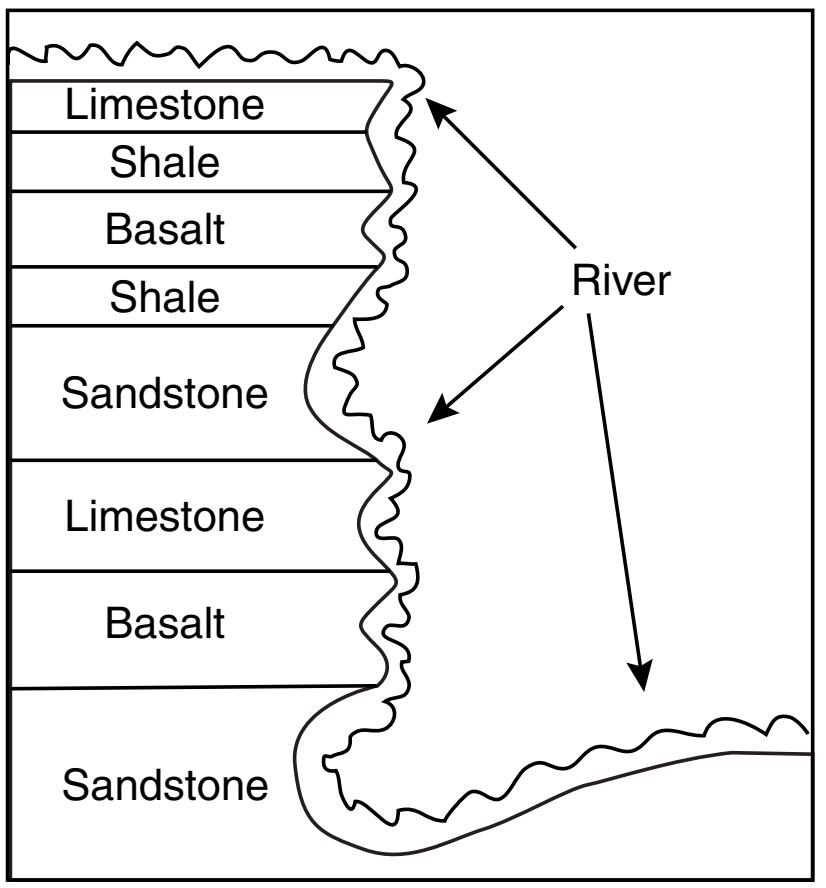
A steel
B tin
C aluminum
D titanium

16 From the Piedmont province to the Coastal Plain, the land drops as much as several hundred feet. This drop, which is abrupt in some places and gradual in others, is known as the Fall Line. What feature(s) would rivers exhibit when they cross the Fall Line?

F Waterfalls and rapids
G Sudden increases in water volume
H Significantly higher water temperatures
J Shallow beds and slow currents

GO ON

17



Which type of rock appears to be the most easily eroded by the river in this area?

A Limestone

B Shale

C Basalt

D Sandstone

GO ON

18 One part of California is on the Pacific Plate, while the remainder of the state is on the North American Plate. The two plates are moving to the northwest at different speeds, causing one plate to slide past the other. This movement in plates creates a

F normal fault

G reverse fault

H strike-slip fault

J thrust fault

GO ON

19 A seismogram is a record of primary waves and secondary waves emitted by an earthquake. Primary waves and secondary waves are generated at the same time, but primary waves are recorded first because they

A travel a shorter route

B travel faster

C are smaller

D do not travel through water

20 Why does water move more slowly through clay than through humus?

F Clay has greater permeability.

G Clay has very small pore spaces.

H Clay prevents capillary attraction of water.

J Clay reduces evaporation rates.

I	II	III	IV
Developed soil supports thick vegetation	Bedrock begins to disintegrate	Horizons form	Organic materials speed up disintegration
Organic matter		Mineral fragments and organic matter	Organic matter
A horizon		A horizon	
B horizon	Disintegrating Rock		
Parent material		Parent material	Parent material
C horizon		C horizon	
Bedrock	Bedrock	Bedrock	Bedrock

GO ON

21 The outline on the previous page represents various stages of soil development. The correct order in which these stages should be ordered is

A I, II, IV, III

B III, I, II, IV

C II, IV, III, I

D III, II, IV, I

GO ON

22 In karst regions, caves are carved by the flow of water through limestone bedrock. How do the stalagmites and stalactites in the caves develop?

F They are carbonate deposits formed by dripping water in air-filled cavities.

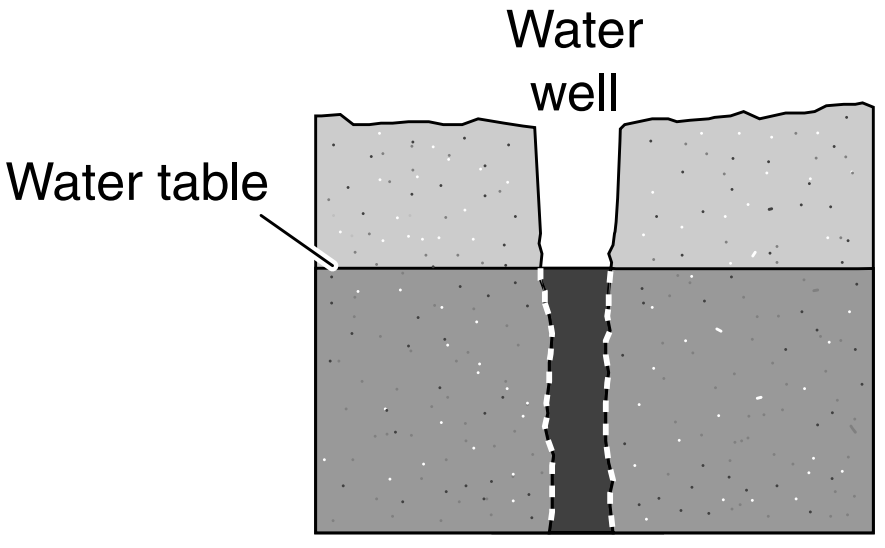
G They are granite intrusions that remain behind after water dissolves the surrounding limestone.

H They are crystals that grow as water hollows out the cavern.

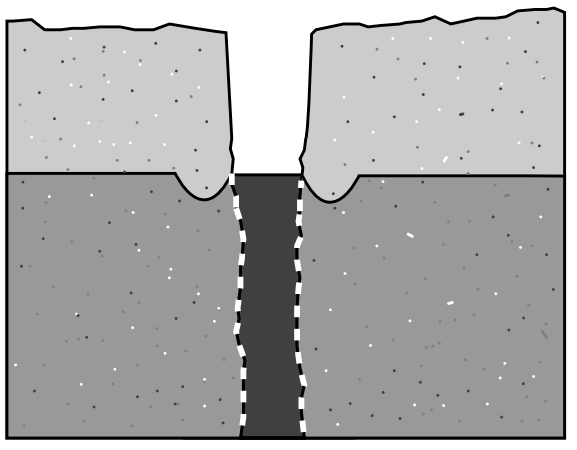
J They are carvings made in limestone by the swirling water as it hollows out the cavern.

GO ON

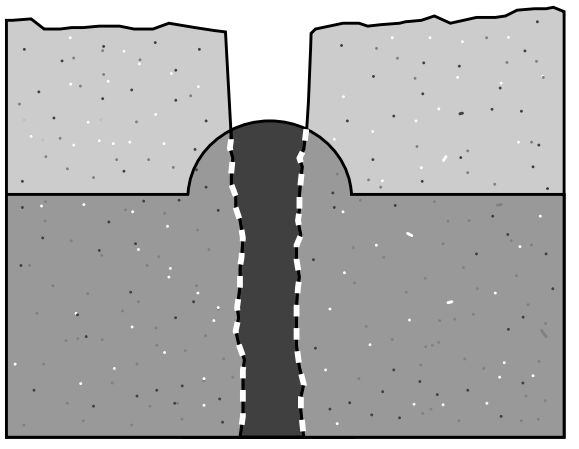
23



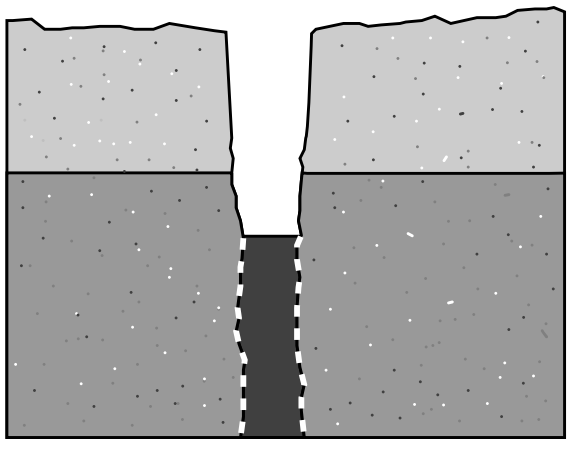
The drawing above shows the water table in the vicinity of a newly drilled well. Which of the drawings below shows the appearance of the water table several months later when the well has been in regular use?



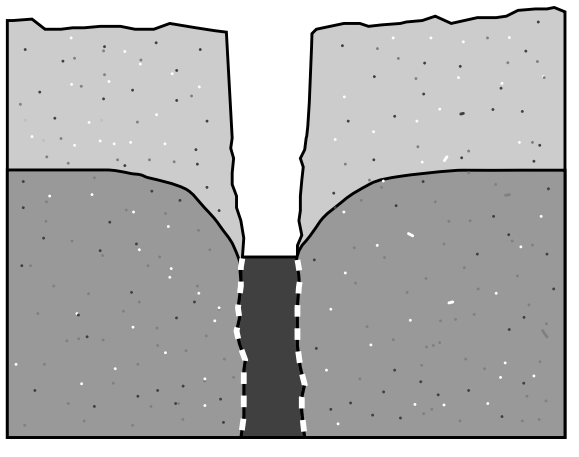
A



C



B



D

GO ON

24 **Ocean → Evaporation → Condensation**

Which of these would come next in the water cycle?

F Aeration

G Sedimentation

H Deposition

J Precipitation

25 **Only 3% of the Earth's water is fresh water. The world's oceans contain the rest of the Earth's water. Of that 3%, three fourths is tied up in glaciers, ice caps, and snow fields. Antarctic glaciers contain nearly 85% of all the ice in the world, and floating sea ice in the Arctic contains 10% of the ice. Sea ice freezes from ocean water, but the salt is excluded in the freezing process, resulting in mostly freshwater ice. Where is the remaining 5% of the world's permanent supply of ice and snow?**

A High mountain peaks

B Permanent Arctic blizzards

C Floating icebergs

D Drifting Antarctic snow

GO ON

26

Land Cover	Runoff
Grassland	10% - 50%
Crop land	30% - 70%
Bare clay soils	50% - 80%
Asphalt streets	70% - 95%

Which type of land cover absorbs the most rainwater?

F Grassland

G Crop land

H Bare clay soils

J Asphalt streets

27 Not all fossils have been preserved inside soil or rock. Explorers in Siberia have discovered the bodies of ancient mammoths so well-preserved that the flesh could be eaten. What do you think preserved the mammoths in such a perfect state?

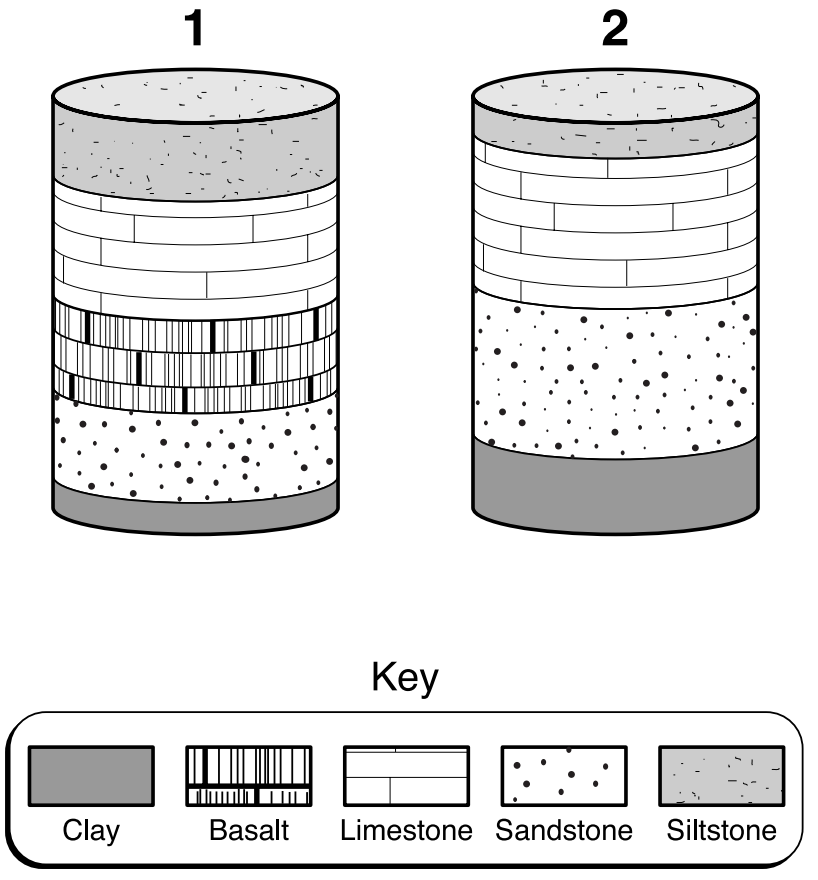
A Water
B Ice
C Leaf mold
D Carbon dioxide

28 Jellyfish have rarely been fossilized because they

F contain no carbon compounds
G are very rare animals
H are generally found in oceans
J have soft bodies

GO ON

29



Scientists use drill core samples to study the underlying rock structure. These two core samples were obtained from the ocean floor from locations separated by 10 km. Which layer in core sample one does not have a matching layer in core sample two?

A Basalt

B Clay

C Limestone

D Sandstone

GO ON

30 If the polar ice caps were to melt, all of the following would occur EXCEPT

F increased coastal flooding

G increased sea level

H decreased ocean salinity

J decreased tidal action

31 Many species of the order Cetacea (whales, dolphins, and porpoises) have become so scarce that they are now protected under international law. Which of the following probably did NOT contribute to the decline in these populations?

A Whaling industry

B Fishing nets

C Ocean pollution

D Greenhouse effect

32 **Oil spills have a tremendous impact on the ocean environment, and the oil must be cleaned up after these spills. A new technique for cleaning oil from beaches is called bioremediation. This technique uses naturally-occurring bacteria to break down the oil. How is this accomplished?**

F The bacteria bind with the oil and bring it to land.

G The bacteria pull the oil down to the ocean floor.

H The bacteria chemically change the oil into less harmful substances.

J The bacteria die and absorb the oil.

33 All of the following are sources of energy derived from the ocean EXCEPT

A coal
B thermal
C tides
D waves

34 All of the following features of the ocean indicate tectonic activity EXCEPT

F abyssal plains
G mid-ocean ridges
H seamounts
J trenches

GO ON

35 Which of these causes days and nights?

A The orbit of the Earth around the sun

B The revolution of the moon around the Earth

C The rotation of the moon on its axis

D The rotation of the Earth on its axis

36 The moon rotates on its axis at the same rate that it revolves around the Earth. This causes

F very high tides

G the phases of the moon

H partial eclipses of the moon

J one side of the moon to always face the Earth

37 Photographs of the surface of Mars reveal the presence of sand dunes that shift over time. These dunes demonstrate the presence of what phenomenon on Mars?

A Precipitation

B Winds

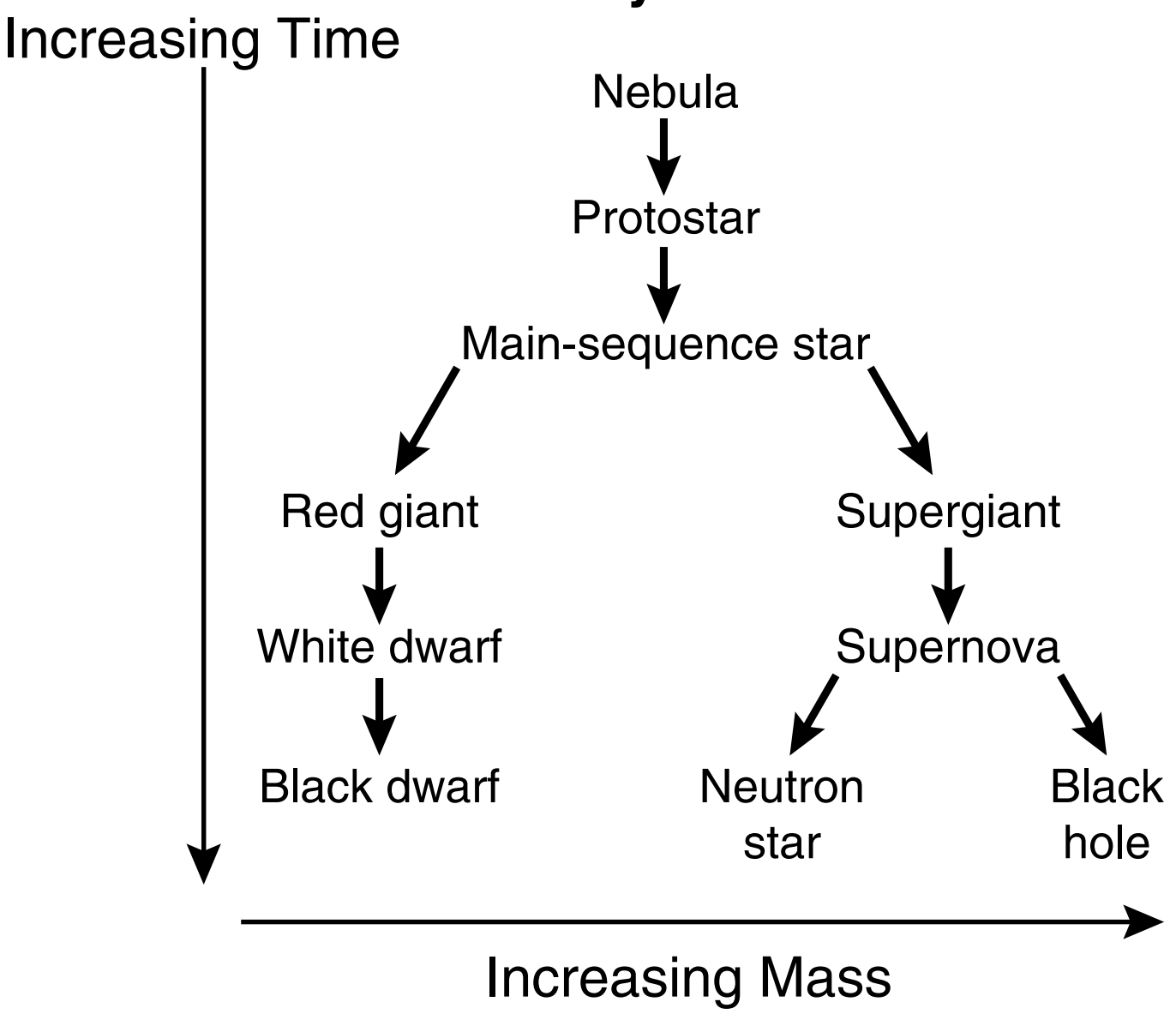
C Magnetic pole reversals

D Plate tectonics

GO ON

38

The Life Cycle of a Star



Which of these stars has completed its life cycle?

F Black dwarf

G Supergiant

H Main-sequence star

J Red giant

GO ON

39 What powers stars?

A Combustion

B Fission

C Fusion

D Radioactivity

40 Which of these facts is the best supporting evidence that the universe is expanding?

F The stars vary in chemical composition.

G The galaxies are moving away from each other.

H The galaxies can spin to form eddies.

J The universe is filled with galaxies of different sizes.

STOP

Answer Key

Test Sequence Number	Correct Answer
1	A
2	F
3	A
4	G
5	D
6	H
7	A
8	J
9	D
10	H
11	C
12	H
13	C
14	G
15	C
16	F
17	D
18	H
19	B
20	G
21	C
22	F
23	D
24	J
25	A
26	F
27	B
28	J
29	A
30	J
31	D
32	H
33	A
34	F
35	D
36	J
37	B
38	F
39	C
40	G